

VULCAN: Studying the fluorescence response of PTFE to incident VUV light in cryogenic conditions

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Rare-event searches such as dark matter direct detection experiments rely on accurate detection of scintillation photons to observe signals from very low-energy events. It has been suggested that materials used in the construction of these experiments, such as PTFE, can fluoresce under excitation from the target material's scintillation light. This scintillation light is in the vacuum ultraviolet (VUV) region and is readily absorbed by molecules such as oxygen in the air presenting its own unique list of challenges when it comes to its manipulation. VULCAN (Vacuum ULtraviolet Characterisation At Nikhef) aims to measure the fluorescence and reflectivity of detector material samples under VUV light excitation at the temperatures experienced in these dark matter detectors. This will aid in the understanding of possible backgrounds introduced in such experiments and enable improved signal-to-noise ratios in analyses at low energies.

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